0083-0865-2

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF:

Masashi GOTOH, et al. : EXAMINER: CUNEO, K.

SERIAL NO.: 09/119,626 :

FILED: July 21, 1998 : GROUP ART UNIT: 2831

FOR: CIRCUIT BOARD HAVING BONDING AREAS TO BE JOINED WITH BUMPS BY ULTRASONIC BONDING :

AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

In response to the Official Action dated March 16, 2000, please amend the above-identified application as follows:

IN THE SPECIFICATION

Please amend the specification as follows:

Page 10, line 16, after "margin" insert --4c--; and

line 17, after "inside" insert --4d--.

Page 14, lines 10-18, delete in their entirety and insert the following:

--In the description of the first embodiment, the conductive layer 3 is described as being etched to form slits for the notch parts 8a and 8b. In such a process, during the formation of the thick-film conductive layer, masking is executed through a screen so that the screen prevents the depositing of portions of the thick-film conductive layer on the board main body where the notch parts are located. Of course, the notch parts 8a and 8b can also be

formed by laser beam machining, etc., and the conductive layer 3 can also be slit by post-treatment processes to form the notch parts. If post-treatment processes are used to form the notch parts, a part is actually mounted on a--.

Page 14, lines 26-27, change "to the board main body 2 all in the thickness direction" to --in the thickness direction to the board main body 2--.

IN THE CLAIMS

Please cancel Claims 1-3 without prejudice or disclaimer.

Please add the following new claims:

--7. A circuit board for mounting a part having a plurality of bumps by ultrasonic bonding, said circuit board comprising:

a main body; and

a conductive layer provided on said main body, said conductive layer having a conductive pattern, said conductive pattern having at least one bonding area configured to correspond to the plurality of bumps of the part, said conductive layer having one of an isolated notch part and recess located proximate said at least one bonding area, wherein said notch part or said recess is configured to extend in a direction traverse to an ultrasonic vibrating direction of the ultrasonic bonding.

8. The circuit board as claimed in claim 7, wherein said notch part or said recess partially narrows said conductive pattern to form a narrow pattern part.

9. The circuit board as claimed in claim 7, wherein said notch part or said recess narrows said conductive pattern at said at least one bonding area.

10. A method of mounting a part having a plurality of bumps on a circuit board by ultrasonic bonding, said method comprising the steps of:

providing a circuit board comprising a main body, and a conductive layer provided on the main body, the conductive layer having a conductive pattern, the conductive pattern having at least one bonding area configured to correspond to the plurality of bumps of the part, the conductive layer having one of an isolated notch part and recess located proximate the at least one bonding area, wherein the notch part or the recess is configured to extend in a direction traverse to an ultrasonic vibrating direction of the ultrasonic bonding; and

subjecting the part and the circuit board to ultrasonic bonding in the ultrasonic vibrating direction.

11. The method as claimed in claim 10, wherein the notch part or the recess partially narrows the conductive pattern to form a narrow pattern part.

12. The method as claimed in claim 10, wherein the notch part or the recess narrows the conductive pattern at the at least one bonding area.--

IN THE ABSTRACT

Please delete the original Abstract and insert the following substitute Abstract of the Disclosure:

--ABSTRACT OF THE DISCLOSURE

A circuit board for mounting a part having a plurality of bumps by ultrasonic bonding. The circuit board includes a main body and a conductive layer provided on the main body. The conductive layer has a conductive pattern having at least one bonding area configured to correspond to the plurality of bumps of the part. The conductive layer has an isolated notch part located proximate the at least one bonding area.--

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 4-12 are presently active in this case, Claims 1-3 having been canceled and Claims 7-12 having been added by way of the present Amendment.

The Applicants respectfully traverse the Examiner's conclusion that Claims 4-6 do not read on the elected species. The elected species is "the conductive pattern all the way removed as in figure 1 with the shape of a rectangle as shown in figure 1." The election does not state that the rectangle need be an "isolated" part. Accordingly, the Applicants request reconsideration of the determination, and consider Claims 4-6 on their merits.

In the outstanding Official Action, the drawings and the specification were objected to for the reasons stated on pages 2-3 of the Official Action. The last paragraph on page 1 states that Figures 11 and 12 depict circuit board examples of the related art. Submitted concurrently herewith is a Letter Requesting Approval of Drawing Changes which includes amendments in red ink to Figures 11 and 12 that add the legend "Related Art" thereto in order to clarify that the subject matter shown therein is from the related art. Additionally, amendments have been made to Figures 2, 3, and 12 to correct any cross-hatching problems. Note, however, that the cross-hatching used in the figures is merely representative of preferred embodiments of the present invention, and are not meant to limit the scope of the claims in any manner. The second paragraph on page 14, as well as the last two lines on page 14, have been rewritten to clarify the intended meaning thereof. The specification has been amended on page 10 and Figure 1 has been amended to clarify which structure represents the margin and the inside of the conductive pattern. The Abstract of the Disclosure has been revised to concisely describe the claimed invention. Accordingly, the Applicants request the withdrawal of the objections to the drawings and the specification.

Claims 1-3 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The specific grounds for rejection are recited on pages 3 and 4 of the Official Action. Claims 1-3 have been canceled, thereby rendering the indefiniteness rejection moot. Accordingly, the Applicants request the withdrawal of the indefiniteness rejections of Claims 1-3.

Claims 1-2 were rejected under 35 U.S.C. 102(b) as being anticipated by Martin (U.S. Patent No. 3,908,185). Claims 1 and 3 were rejected under 35 U.S.C. 102(e) as being anticipated by Lebaschi (U.S. Patent No. 5,764,485). Claims 1-3 have been canceled, thereby rendering the anticipation rejections of Claims 1-3 moot. Therefore, the Applicants respectfully request the withdrawal of the anticipation rejections of Claims 1-3.

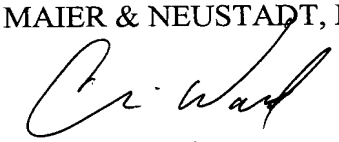
Newly added Claims 7-12 are considered allowable as they recite features of the invention that are neither disclosed, taught, nor suggested by the references of record. For example, independent Claim 7 recites a circuit board for mounting a part having a plurality of bumps by ultrasonic bonding. The circuit board includes a main body, and a conductive layer provided on the main body, where the conductive layer has a conductive pattern having at least one bonding area configured to correspond to the plurality of bumps of the part. The conductive layer has one of an isolated notch part and recess located proximate the at least one bonding area, wherein the notch part or the recess is configured to extend in a direction traverse to an ultrasonic vibrating direction of the ultrasonic bonding. Neither the Martin reference, nor the Lebaschi reference disclose a circuit board having the configuration recited in Claim 7. Specifically, the cited references do not discuss or disclose a circuit board including a notch part or recess configured to extend in a direction traverse to an ultrasonic vibrating direction of the ultrasonic bonding, thereby affecting the ultrasonic bonding conditions. See page 11, line 10, through page 12, line 10 of the present application. The

Martin reference describes wire bonding carried out on an individual basis, rather than using ultrasonic bonding to simultaneously bond a plurality of bumps to a conductive pattern. Additionally, the Lebaschi reference does not relate to ultrasonic bonding, and uses a plurality of solder-balls. Similarly, Claim 10 which recites a method of mounting a part having a bump on a circuit board by ultrasonic bonding, is not disclosed or suggested by the cited references for the reasons discussed for Claim 7. Furthermore, Claims 8-9 and 11-12 are considered allowable for the reasons advanced for Claims 7 and 10 from which they depend. These claims are further considered allowable as they recite other features of the invention that are neither disclosed, taught, nor suggested by the applied references when those features are considered within the context of Claims 7 and 10.

Consequently, in view of the above discussion, it is respectfully submitted that Claims 4-12 are patentably distinguishing over the cited art. The present application is therefore believed to be in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



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